

Appln. No. 09/668,938
Amdt. dated March 10, 2004
Reply to Office Action dated December 22, 2003

R E M A R K S

Reconsideration of the present application, as amended, is respectfully requested.

The December 22, 2003 Office Action and the Examiner's comments have been carefully considered. In response, claims are amended and added, and remarks are set forth in a sincere effort to place the present application in form for allowance. The amendments are supported by the application as originally filed. Therefore, no new matter is added.

CLAIM OBJECTIONS

In the Office Action, claims 1 and 18 are objected to because the Examiner contends that there is a lack of proper antecedent basis. In response, claims 1 and 18 are amended as suggested by the Examiner. In view of the amendment of claims 1 and 18, reconsideration and withdrawal of the objection to claims 1 and 18 are respectfully requested.

PRIOR ART REJECTIONS

In the Office Action claims 1, 2, 4, 5, 7, 18, 20 and 21 are rejected under 35 USC §103(a) as being unpatentable over USP

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3,952,201 (Hounsfield) in view of USP 5,482,042 (Fujita). Claims 6 and 8 are rejected under 35 USC §103(a) as being unpatentable over Hounsfield in view of Fujita, and further in view of USP 4,547,892 (Richey et al.). Claim 9 is rejected under 35 USC §103(a) as being unpatentable over Hounsfield in view of Fujita and Richey et al., and further in view of USP 4,751,644 (Koka et al.). Claim 10 is rejected under 35 USC §103(a) as being unpatentable over Hounsfield in view of Fujita and Richey et al., and further in view of USP 4,878,499 (Suzuki et al.).

The Examiner's rejections are respectfully traversed in view of amendments to claims 1 and 18.

With respect to the rejections of claims 1, 2 and 4-10, claim 1 is amended to include the feature of the movement of the X-ray device being controlled by "controlling a start of each of the X-ray cycles based on the motion signal to cause each X-ray cycle to commence at a different instant in the different phases of motion of the organ". An X-ray cycle is defined as a cycle in which all of a plurality of different X-ray positions are successively occupied.

Control of the start of the X-ray cycles enables a projection data to be acquired in a low-motion phase from every

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X-ray position after two X-ray cycles for some motion signals (as described in the specification at page 6, lines 11-25). As shown in Fig. 4, a first cycle commences at one instant in the low-motion phase H1, e.g., the approximate beginning thereof, whereas the second cycle commences at one instant in the high-motion phase H2, e.g., the approximate beginning thereof. When determining when to start an X-ray, the motion signal is monitored to determine a different starting instant from previous X-ray cycles since it is not generally desired that two X-ray cycles start at the same instant in the motion signal.

By varying the start of the X-ray cycles based on the motion signal, an advantage is obtained is that the X-ray device will be positioned at each X-ray position while the organ is in the low-motion phase in a minimum of X-ray cycles.

Hounsfield describes an X-ray device having a scanner including an X-ray source 4 and X-ray detector 6 mounted on a turntable member 7 which rotates around a body 1 being examined. Irradiation of the body 1 occurs via operation of the X-ray source 4 when the amplitude of the motion of the body 1 is below a threshold (see Figs. 2(a)-2(c)). Since the scanner does not obtain X-ray images from angular positions in which it is not

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operating during a first revolution of the member 7 about the body 1 (e.g., angular positions α - β in Fig. 2(c)), in a second revolution, the speed of a motor 8 which controls rotation of the member 7 is adjusted so that the X-ray source 4 is active between angular position α - β .

In contrast to the invention, Hounsfield does not disclose controlling the start of multiple X-ray cycles based on a motion signal to cause each X-ray cycle to commence at a different instant in the different phases of motion of the organ. Indeed, there is no consideration given to the status of the motion signal in Hounsfield when determining when to start rotation of the member 7 on which the X-ray scanner is mounted. Rather, the member 7 continuously rotates at a speed which is adjusted in each rotation to enable X-ray images to be obtained over a complete revolution of the member 7 about the body 1.

Fujita also does not disclose, teach or suggest controlling the start of multiple X-ray cycles based on a motion signal to cause each X-ray cycle to commence at a different instant in the different phases of motion of the organ.

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In view of the foregoing, claim 1 is patentable over Hounsfield and Fujita when taken either alone under 35 USC §102 or in combination under 35 USC §103(a).

The other references of record do not close the gap between the present claimed invention as defined by claim 1 and Hounsfield in view of Fujita.

Therefore, claim 1 and claims 2 and 4-10 which are dependent thereon are patentable over all of the references of record under 35 USC §102 as well as 35 USC §103.

With respect to the rejections of claims 18, 20 and 21, independent claim 18 is amended to include the subject matter of allowable claim 19. In view of the Examiner's indication that claim 19 would be allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims, claim 18 and claims 20 and 21 which are dependent thereon should be allowable.

NEW CLAIMS

New claims 22-28 are presented and are either directly or indirectly dependent on claim 1. The features of claims 22-28 are

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described in the specification as originally filed. Therefore,
no new matter is introduced by the presentation of these claims.

It is respectfully submitted that no additional fees are due
for the presentation of claims 22-28 since the application as
pending after entry of this Amendment includes no more than three
(3) independent claims and twenty (20) total claims. However, if
any additional fees are due, please charge Deposit Account No.
14-1270 for such sum.

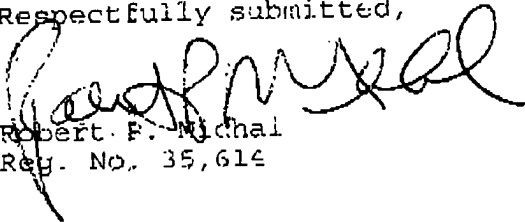
If the Examiner disagrees with any of the foregoing, the
Examiner is respectfully requested to point out where there is
support for a contrary view.

Entry of the amendment, allowance of the claims, and the
passing of the application to issue are respectfully solicited.

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If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,



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March 10, 2004

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